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STORING FRUITS AND VEGETABLES

U. S. Department of Agriculture

A radio interview conducted by Morse Salisbury, Chief of Radio Service, with W.R. Beattie, horticulturist, Bureau of Plant Industry and broadcast at 1:05 p.m. Tuesday, August 19 through 38 radio stations associated with the National Broadcasting Company.

BEATTIE:

Back on the job today after a week's absence during which I attended the annual convention of the Vegetable Grower's Association of America at Milwaukee, Wisconsin. It may seem strange to many of you who live in the drought-stricken area that we should be talking about the storage of fruits and vegetables just as though your gardens weren't burned to a crisp, and your fruits ^{fairly} almost a failure. A large part of the country, however, has very ^{fair} crops, besides there is still a chance that many of you may be able to grow turnips, beets, carrots, and a number of fall crops after the rains do start. My suggestion is that you have seeds ready to plant in case you do get enough moisture to give the plants a start.

The storage of fruits on the farm applies primarily to apples, pears and grapes, with apples as the most important. When it comes to vegetables, there are no less than 12 or 15 kinds that can be stored to advantage. Right at the outset, let me say that temperature control and ventilation are the main factors in the successful storage of these products. The vegetables can be divided into two classes, one class that requires a relatively low temperature, say from 36 to 50 degrees, with a reasonable amount of moisture, while the other class requires a temperature of 50 to 65 degrees with dry conditions. The fruits can best be stored at a relatively low temperature just above freezing. Roots of certain flowers such as canna, dahlias, and gladiolus also require winter storage.

The problem confronting most of us is where are we going to store our garden and orchard products for winter use. In order to bring out some of the points that I think will be of interest and help to many of you, I called on Dr. John R. Wagness, who is at the head of the fruit investigations of the Department, and my brother, J.H. Beattie, who is engaged in vegetable production investigations, and who has given the question of vegetable storage on the farm, a lot of attention, to answer a number of questions along the line of vegetable storage.

SALISBURY:

Now to get at the chief points that we want to bring to the attention of the Farm and Home family. Mr. Beattie, if you had a quantity of apples that you wanted to store for home use or for selling during the winter, how would you go about it? First, where would you store the apples?

BEATTIE:

I would store the apples any place where I could keep the temperature reasonably low. If I had a good cool cellar that was well ventilated, I would store them in it. If I had a good cellar which was not well ventilated, I would see if I could not add the necessary ventilation.

SALISBURY:

What do you consider reasonably good storage conditions for caring for apples on the farm?

BEATTIE:

I would consider what we term common storage the best way to keep apples on the farm. By common storage, I mean a room or enclosure in the cellar, in the barn, in some outbuilding, or any convenient place which is sufficiently well insulated to prevent freezing, and which has doors or other openings so that cool air can be brought in at night and at times when the outside temperature is lower than that of the storage room. These openings should be closed in the daytime or at times when the temperature is high on the outside. In other words, we want a well protected enclosure in which we can get the temperature down as near the freezing point as possible, of course, without the aid of artificial cooling. There are many of these houses scattered over the country where apples are stored until they are marketed, and the temperature control in these houses is entirely through ventilation.

SALISBURY:

In what part of the United States can common storage, which depends upon natural cooling by ventilation be depended upon to keep apples for winter use?

BEATTIE:

It depends somewhat upon the season, but as a rule, storage houses or rooms of this character are satisfactory throughout the northern portion of the country, that is, say north of the Mason and Dixon Line. There are locations south of this line where, due to elevation, the nights become cool early in autumn, and it is possible to get relatively low temperatures in the storage house.

SALISBURY:

You say, relatively low temperatures, what do you mean by relatively low temperatures?

BEATTIE:

I mean, down to about 45 degrees by November, and below this for the rest of the winter. A fairly good storage should hold fruits as low as the average outside temperature during the fall. Ventilation openings about the top of the room generally give the best results.

SALISBURY:

What fruits in addition to apples can be stored in a natural storage such as you have described?

BEATTIE:

Pears, to some extent, especially Kieffer, Anjou and Winter Nellis varieties which are good keepers. Grapes can be stored only temporarily in ordinary storage.

SALISBURY:

If you were to build a storage for the keeping of apples and other fruit, what kind of insulation would you use?

BEATTIE:

A basement or dugout storage, mostly below ground, does not require special insulation. Concrete or stone walls, and a well drained dirt floor, are satisfactory. Where a section of a cellar is being partitioned off to form a storage room, cinder building blocks make a good wall through which heat does not readily pass. Some of the forms of wall board are all right as insulating material for above-ground storages. If the basement of the house is to be used for storage, partition off a section at a point the farthest away from the furnace and provide plenty of window openings to let in fresh air.

SALISBURY:

Are there any special points about the handling of apples that are to go into storage?

BEATTIE:

Yes, indeed. In the first place, apples should be allowed to get reasonable ripe, but not overripe on the trees. They should then be picked and handled very carefully to avoid bruising. They should be cooled rapidly by allowing them to stand out-doors over-night before putting them in the store room. They should not, however, be left exposed to the sun after they are gathered. After the apples are placed in the store-house, give them plenty of ventilation at night to lower the temperature.

You can store them in bushel baskets, in hampers, on shelves, in barrels or in crates, but not in tins, because they do not get enough air circulation when stored in bins.

SALISBURY:

Now let us see how the storage of apples ties in with the storage of vegetables where we have a much larger number to consider. Mr. Beattie, has suggested we divide them into two groups. In the first group, those requiring a relatively low temperature, but above freezing, we have potatoes, cabbage, onions, beets, carrots, turnips and celery. In the other group requiring higher temperature we have sweet potatoes, pumpkins, squashes and tomatoes.

Now, I want to put to Mr. Beattie a few questions that I believe many of you would be asking were you here with us today. First, about the kind of place in which to store vegetables, how about it, Beattie, what has been your experience?

BEATTIE:

That depends on where you are located, anywhere in the North where you can lower the temperature by ventilation, the type of cellar or house described for the storage of apples will answer for most vegetables. I have found that a cool corner of a cellar underneath the house, or a barn cellar to be fairly satisfactory, but the ideal would be to construct a small storage with an underground portion in which to store potatoes and root crops, and with an above-ground or partly above-ground portion in which to store apples and other fruits. Onions, for example, require a dry, cold air, and would not store to advantage in the same compartment with potatoes and the root crops. Onions, cabbage, and turnips are liable to give rise to objectionable odors in the cellar and in the dwelling, and we recommend that these be stored elsewhere whenever possible. We have visited several storage houses which were built of concrete blocks or cement for the basement portion, and lumber with plenty of insulating material for the upper portion. In some cases, the entire structure is of concrete block, but some form of lining or insulating material is necessary. The main point is to have plenty of inlets for cold air and roof ventilators to carry off the warm air. Underground pits are satisfactory for the storage of vegetables, provided they can be ventilated. In the South, the problem of providing a storage is more difficult, but the old-fashioned sod cellar built under the shade of a tree and with a door in each end, also ventilators in the top, has much to recommend it.

When it comes to storing sweet potatoes, however, the storage house should be built entirely above ground, and so constructed that it can be kept warm during the winter.

SALISBURY:

What temperature does the Department recommend for the storage of sweet potatoes?

BEATTIE:

We recommend a curing temperature of 75 to 85 degrees for a period of about 10 days, after which the temperature should be lowered ^{to} about 55 degrees and kept as near that point as possible.

SALISBURY:

What other vegetables may be stored under the same conditions as sweet potatoes?

BEATTIE:

Pumpkins and squashes require about the same treatment as sweet potatoes. Green tomatoes do not require any curing period, but they ripen best if kept at a temperature of about 65 to 68 degrees.

SALISBURY:

How about storing sweet potatoes in outdoor pits?

BEATTIE:

We do not recommend it. Sweet potatoes may be successfully stored in crates placed on a shelf near the heater in the basement, or in a warm upstairs room. If thoroughly cured for 10 days at about 85 degrees with free ventilation, they will keep in these places. They should not be packed in sand.

SALISBURY:

What vegetables do you think can be stored satisfactorily in outdoor pits, especially in the Northern States?

BEATTIE:

Practically all of those that require a low temperature and a reasonable amount of moisture, including potatoes, cabbage, beets, carrots, turnips and rutabagas. Parsnips and salsify can remain in the rows where they grew as freezing does not hurt them. Celery can be stored in a trench or in the pit of a hotbed, in fact, anywhere that it can be kept cool and not allowed to actually freeze.

Now, we emphasized the importance of not allowing stored products to freeze. While the freezing temperature of apples is approximately 28 degrees, and the freezing temperature of certain vegetables is below 32 degrees, I would recommend that you keep the temperature of your storage above 32 degrees. As a matter of fact, if you can hold the temperature at

about 38 degrees, or at the lowest, 36 degrees, you will be safe and get excellent results. I have also found that vegetables keep to better advantage if they are not stored in too large quantities. Potatoes are an exception and can be kept in bins, but I find barrels with a few auger holes for ventilation are more satisfactory for storing the home supply. Barrels are easy to move and when they are empty can be cleaned and kept for another year. Cabbage can be stored to best advantage on slat shelves. Beets, turnips, and carrots are best stored in boxes or barrels covered with slightly moistened sand. Add a little water from time to time to keep the sand from drying out. For sweet potatoes, I like ventilated bushel baskets or hampers. Pumpkins and squashes should be laid on shelves, and preferably well above the floor of the storage house. When it comes to storing the roots of canna and dahlias, I use boxes containing sand, or I place canna on the cellar floor and sprinkle a little soil over them.

SALISBURY:

We can supply you with a little Farmers' Bulletin No. 8-7-9 on the "Home Storage of Vegetables." For those of you who are interested in the storage of sweet potatoes, the Department can furnish plans and specifications for the construction of sweet potato storage houses ranging in size from 500 to 20,000 bushels capacity. If you have special storage problems, do not hesitate to write to us, or take the matter up with your county agent.
